



the United States Patent and Trademark office

In Re application of:) Date: May 14, 2007
Neil John Graham) Group art unit: 3732
Serial number 10/733,728) Examiner: Jonathan S. Werner
Filed: 12/12/2003)
For: Orthodontic Accessory Arch Bar)
_____)

Honorable Commissioner of Patents and Trademarks

Dear Sir:

In response to the communication from the examiner, dated Feb. 21, 2007 please amend the application as follows:

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1, 7, 13, 19 and 25, Applicant claims an arch bar that is "attached to a fixed orthodontic appliance by piggybacking on the labial . side of an installed orthodontic appliance." However, it is not clear how the arch bar can be fixed to said appliance by piggybacking on an installed orthodontic appliance since it is not disclosed whether the two appliances (i.e. the "fixed" and "installed") are distinct – i.e. how piggybacking the arch bar to an installed appliance can attach it to a separate fixed appliance.

This was fully responded to in the 8/31/ 06 response.

Additionally, Examiner does not understand how the longitudinal body of the wire can become curved if placed on the installed orthodontic appliance as opposed to the fixed appliance.

This was fully responded to in the 8/31/ 06 response.

8/31/06 response:

Note the end of the above sentence: “to a **separate fixed appliance**”. Nowhere is this term (**fixed appliance** instead of **fixed orthodontic appliance**) used in Claims 1, 7, 13, 19 and 25. The specification with the drawings clearly describes what the orthodontic appliance is. Only a single orthodontic appliance is described and several adjectives are used to describe this single appliance.

Referring to the discussion above, a **fixed orthodontic appliance** and **installed orthodontic appliance** and **fixed orthodontic appliance** are synonymous terms, which are well known by an expert of ordinary skill in the art of orthodontics. The term **orthodontic appliance** also has the same meaning as it used in the specification.

It has been clearly disclosed in the present application that the accessory (or piggybacked) arch bar and the fixed orthodontic appliance (or its synonyms) are separate: Fig. 1 shows the accessory arch bar 1 separate and adjacent (buccal) to the arch wire 11 of the fixed appliance. The accessory arch bar is shown in Fig. 2A **outside (distinct) (piggybacked)** the orthodontic bracket 10 slot, with a single tie 13 (**how affixed**) attached to the bracket wing 10 (**how affixed**), the single tie containing both the arch bar and the arch wire attaching the arch bar to the fixed orthodontic appliance (**bracket and arch wire**). Figs. 5B and 5B show the arch bar 1 adjacent (**accessory or piggybacked**) to an arch wire 30 (**part of fixed appliance**) wherein the arch bar 1 and the arch wire 30 are **distinctly separate**. Figs. 6C and 6D show the accessory bar **distinctly and piggybacked, or accessory,** to the fixed orthodontic appliance with ligature ties which attach to the bracket wings. Figs. 6C and 6D show the same arrangement. Figs 7-12 show the arch bar as being distinctly separate and Figs. 10 and 12 show the arch bar being secured the fixed appliance with the ties. [0004] lines 3-9: ‘The arch bar piggybacks (or accessory to) the orthodontic arch wire and extends, just as the arch wire does, on the labial of the teeth. The arch bar may be attached to the orthodontic appliance using the same ligature ties used to tie the arch wire to the orthodontic brackets’. [0033] Lines 1-10: “As shown in FIG. 2, an orthodontic appliance is comprised of brackets 10 placed on the outer surface of the patient’s teeth 12. An arch wire 11 is connected to the brackets 10 and held in place with ties 13, which can be metal wire or elastomeric eyelets. In FIG. 3 the accessory arch bar 1 is shown attached to the orthodontic appliance (**how fixed to braces**) using the same ties 13 which ligate the arch wire 11 to the orthodontic brackets 10. In another embodiment the arch bar 1 can be tied with separate ties 13 to the orthodontic appliance. The single tie 13 method is more efficient”. Claim 1, lines 11-15: Claim 7, lines 12-16; Claim 19, lines 14-18; Claim 25, lines 14-18: “a tying means for attaching the accessory arch bar to an orthodontic appliance wherein a wire ligature or an elastomeric orthodontic module is used to attach the accessory arch bar to an orthodontic arch wire or directly to orthodontic brackets“(How fixed to braces)

{ New} Additionally, Examiner does not understand how the longitudinal body of the wire can become curved if placed on the installed orthodontic appliance as opposed to the fixed appliance.

As discussed above, installed orthodontic appliance and fixed orthodontic appliance are synonymous terms. Refer to Fig. 1. The arch bar 1 (accessory) in Fig. 1 is shown formed straight as it comes from the supplier. The wire has elasticity wherein it can be curved to a certain amount, such as the accessory arch bar 1 is pictured in Fig. 2, that when released it will return to its original straight shape as shown in Fig. 1. The accessory arch bar 1 is piggybacked on the fixed orthodontic appliance (as described above) where it has a curved shape, but retains an elastic memory of a straight wire. The action of the arch bar attached to the fixed orthodontic appliance is to “ quickly widen the dental the molar arch width which is particularly useful in widening of the upper arch width in the correction of a posterior dental cross bite “. [0004] lines 14-16.

In the current response, the specification and claims are amended throughout using the term fixed

orthodontic appliance to describe a **fixed orthodontic appliance**, an **installed orthodontic appliance** and **braces** which are all synonymous terms.

With the above amendment the specification and claims along with the drawings clearly disclose what a fixed orthodontic appliance is, how an arch bar is separate from a fixed orthodontic appliance and how a straight arch bar becomes curved when placed upon a fixed orthodontic appliance. Fig. 1 discloses a straight wire 1 and Fig. 2 discloses the straight wire of Fig. 1 attached to a curved. The wire 1 in Fig. 2 becomes straight again when it is removed from the fixed orthodontic appliance. This wire property is elasticity.

Claims are to be construed in light of the specification. Ex parte Kotler, 1901 C.D. 62, 95 O.G. 2684 (Comm'r Pat. 1901). The terms and phrases used in the claims must find clear support or antecedent basis in the description so the meaning of the terms in the claims may be ascertainable by reference to the description. 37 CFR 1.75, MPEP § 608.01 (i) and § 1302.01. Drawings are included if necessary to understand the invention. MPEP § 608.02. Claims are not to be viewed out of context of their specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 31 is rejected under 35 U.S.C. 102(b) as being anticipated by Kesling (4,676,747). Kesling discloses using an accessory arch bar for placing orthodontic force upon the teeth

Kesling very specifically discloses torquing auxiliaries which are secured to the braces as in Col. 4, mounted in archwire slots of the brackets, lines 29-33: “.....(or) leave the main archwire alone in the archwire slot and mount the auxiliary in pins which are suitably interconnected to the brackets.” The shape of the auxiliary is disclosed in Col. 4, lines 54-58: “The cross-sectional shape of the

wire auxiliary,.....Preferably, this shape will be rectangular or square.” The present invention is not capable of torquing the teeth. In Kesling the rectangular or square cross-sectional wire must engage a bracket slot of the same shape in a twisting or torquing manner in order to torque (push the roots towards the tongue) the teeth. The present invention, accessory arch bar, does not engage the bracket slot as Kesling states. In the present invention, claim 31, line 5 states: “placing the accessory arch bar adjacent to the cheek side of an orthodontic appliance”.

consisting of forming a longitudinal arch bar into a pre-determined shape (Figure 2/Column 3, Lines 51-53);

The “form of an arcuate wire” in line 52 is similar but “for applying a torquing force” in lines 52-53 is not. The present invention does not require a wire rectangular or square in cross-section. The Kesling wire must be formed in a fourth dimension, twisting the wire axially.

placing the bar adjacent to the cheek side of an arch wire of an orthodontic appliance (Figure 3);

Fig. 3 discloses a Begg appliance which is probably no longer used anywhere in the world. The torquing wire 20P is disclosed placed between the bracket and the bracket base and towards the gingival. The Kesling bracket slot is actually vertical and the Kesling arch wires are inserted from the vertical direction as disclosed in Fig. 3. The second arch wire 20P in Fig. 3 is within the vertical bracket slot which has been designed to receive both archwires. The second wire in Fig. 3 is not mounted on the cheek side. The Begg (Kesling) appliance has dual arch wires which both fit within the bracket slot which makes both wires part of the fixed orthodontic appliance. Neither wire can be considered an accessory or piggybacked wire.

and ligating the bar to an orthodontic appliance (col 2, lines 3-8).

Col. 5, lines 49-50, state: “.....connected to the bracket by means of a lock pin 26, as seen in Fig. 4.” The present invention does not disclose a locking pin. The locking pin was used in the Begg appliance which is shown in Fig. 4 in Kesling. Merriam-Webster defines ligate: “to tie with a ligature”. Merriam-Webster further defines a ligature: “a filament such as a thread”.

Re claim 31 Kesling does not expressly or inherently describe:

an accessory (piggybacked) arch bar;
placed over the cheek side of an arch wire;

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the....claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Kesling clearly does not anticipate expressly or inherently each and every element as set forth in the claim 31. Kesling teaches a wire that must be rectangular in x-section and must be inserted in a bracket or bracket pin which has a rectangular slot to receive it. Col. 4, lines 59-63, Figs. 14 and 16. Kesling discloses an improved torquing appliance (Abstract). The rectangular x-section is essential in order to produce torque. The present invention is not capable of producing torque.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made

706.02(j) Contents of a 35 USC 103 Rejection

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must **expressly or impliedly** suggest the claimed invention or the examiner **must present a convincing line of reasoning** as to why the artisan would have found the claimed invention to **have been obvious** in the light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

6. Claims 1, 3, 5, 7 and 11 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Wool (US 4,424,033).

Claims are to be construed in light of the specification. Ex parte Kotler, 1901 C.D. 62, 95 O.G. 2684 (Comm'r Pat. 1901). The terms and phrases used in the claims must find clear support or antecedent basis in the description so the meaning of the terms in the claims may be ascertainable by reference to the description. 37 CFR 1.75, MPEP § 608.01 (i) and § 1302.01. Drawings are included if necessary to understand the invention. MPEP § 608.02. Claims are not to be viewed out of context of their specification.

The present invention discloses an accessory wire which is distinctly disclosed as not being an arch wire. Wool distinctly discloses an arch wire, not an accessory wire. Abstract line 1. The following statement is clearly incorrect.

In re claims 1 and 3, Wool shows an arch bar

Wool discloses an arch wire, not an arch bar. The difference was fully discussed in the prior responses. See below in claim 7 discussion.

comprising a metal wire with a longitudinal body having opposing longitudinal ends (Figure 1) and a cross-sectional diameter (Figure 3);

By its omission, not true. Wool discloses the following: "This orthodontic appliance comprises a novel arch wire having posterior segments of circular cross-section and anterior segment at least part of which is rectangular or trapezoidal in cross-section" Abstract. "The cross-section of the posterior segments of the arch wire is circular as shown in Fig. 3, while the anterior segment is rectangular as shown in Fig. 4". Col. 3, lines 66-68. ".....the portions of the arch wire extending through slots in the posterior brackets having circular cross-sections, and the portion of the arch wire extending through slots in the anterior brackets having a uniform non-circular cross-section.....". Claim 1, lines 37-40. claim 3, lines 56-61. Fig. 1 posterior 14, anterior 16: Fig. 3 posterior x-section, Fig. 4 anterior x-section. In summary, the wire diameters are round in the posterior and rectangular or trapezoidal in the anterior and it is an arch wire, not an arch bar.

The present invention in claim 1 claims a cross-sectional diameter. To define the cross-sectional diameter in the present invention the specification with the drawings must be viewed.

“The meaning of the terms in the claims may be ascertainable by reference to the description. 37 CFR 1.75, MPEP § 608.01 (i) and § 1302.01. Drawings are included if necessary to understand the invention. MPEP § 608.02. Claims are not to be viewed out of context of their specification”.

Figs. 1 and 2 arch bar with uniform diameter in its length. Fig.2A and 3A round X-sectional diameter. Figs 7-12 round diameter is evident because it fits into round headgear tubes on the molars. “The cross section of the arch bar is usually circular.....”. Col. 3, [0032], lines 4-5.

The dual wire diameters described above are essential for Wool’s invention and irrelevant in the present invention.

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (i.e. 38; Figure 7);

Number 38 in Fig. 7 is an orthodontic bracket. Wool discloses an arch wire itself. That is the point. Of course it is must be the exact length of an arch wire, similar would not be acceptable.

The present invention in Figs 5B and 5C discloses arch bars 1 shorter than the arch wires they are attached to. Their lengths satisfy the similar standard, but not the exact length requirement of Wool.

a straight longitudinal body which becomes curved when placed on the orthodontic appliance (Figure 7);

All wires in Wool are curved the shape of a dental arch. Figs.1and10. Claim 1 states “the wire is formed into an arch”. The Wool wire starts out curved before it is placed on the teeth. It is called a pre-formed arch wire.

and tying means (i.e. column 4, lines 7-11) for attaching the accessory arch bar to an orthodontic appliance,

This reference is not correct.

wherein a wire ligature (i.e. 44) is used to attach the arch bar to an orthodontic bracket (Figure 7).

Wool does not explicitly disclose that the arch bar has a cross-sectional diameter in the range of 0.025 inches to 0.60 inches. However, Wool does disclose that the arch bar can have a diameter of 0.022 inches (col 6, In 25). Therefore, it would have been obvious to one having ordinary skill in the art at the time of Applicant's invention to make the cross sectional diameter in the range of 0.025 to 0.60 inches since it has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

The examiner has not read the Aug/2006 response where this was covered. The original specification discusses this very clearly. Wool does disclose the cross-sectional size of his arch wires. They are arch wires and cannot exceed .022 inch in diameter because that is the maximum size of a bracket slot into which they must fit.

The novelty of the arch bar is that it is not an arch wire and it exceeds the size of an arch wire due to the fact it does not fit into the bracket slot (see specification).

It would not have been obvious to one having ordinary skill in the art at the time of Applicant's invention to make the cross sectional diameter in the range of 0.025 to 0.60 inches since it has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Any size greater than .022 inch diameter wire is not close enough. It will not fit into any existing bracket arch wire slots. (See specification). To an expert in the art the upper limit of the wire size is .022 inch and any larger size would not be obvious. (The Patent Attorney is the inventor and has practiced orthodontics for over 40 years).

706.02(j) Contents of a 35 USC 103 Rejection

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must **expressly or impliedly** suggest the claimed invention or the examiner **must present a convincing line of reasoning** as to why the artisan would have found the claimed invention to **have been obvious** in the light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

The examiner has not presented a convincing line of reasoning why an artisan would pick an arch wire size that exceeds the maximum size (.022 inch) for an arch wire. Further, Wool neither impliedly suggests a wire size exceeding the size of an arch wire slot and definitely not a wire that did not fit into an arch wire slot.

Prima Facie Obviousness

- (1) Some suggestion or motivation.....to modify.....combine.
- (2) Reasonable expectation of success.
- (3) Prior art must teach or suggest all the claim limitations MPEP § 2143.03. *In re Wilson*, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

Wool fails all three tests. As discussed, there is no motivation or suggestion to exceed the maximum size for an arch wire; a wire larger than .022 inch cannot fit into an arch wire slot; and Wool definitely does not teach .025 inch to .060 inch wire sizes nor a wire uniform in size and x-sectional shape in its entire length.\

Claim 1 is allowable.

Claim 3 is dependent to claim 1 and includes all its limitations; therefore, is allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.*In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

As to claim 5, Wool fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches. Although, Wool does disclose a cross-sectional diameter of the arch bar to be about 0.022 inches (col 6, In 25). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the cross-sectional diameter 0.027 inches since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

This argument fails for the above reasons.

Claim 5 is dependent to claim 1 and includes all its limitations; therefore, is allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious.*In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

In re claim 7, in addition to what was described above,

Claim 7 is allowable for the above reasons.

Wool also shows an arch bar attached to a fixed orthodontic appliance by piggybacking on the labial side of the installed appliance (i.e. 38; Figure 7),

Wool shows an arch wire within bracket slots (see specifications and drawings both inventions) in Fig. 5, No. 14; Fig. 6, No. 16; Fig. 7, see Col. 4, lines 27-33; Fig.13, 78; Fig. 14, 90; Fig. 15, 92; and Fig.16, 92. Note Wool Col. 1, line 25 states: “.....an arch wire is secured **in** the brackets”. Wool does not piggyback the wire.

The arch bar in the present invention does not fit within the bracket (slot) due to impossibility, it is too large. The arch bar is additional to the arch wire it piggybacks. See Fig. 2, 1 (note arch wire 11 is in bracket slot); Fig. 2A; Fig. 3; Fig. 3A; Fig. 6; Fig. 6C, 40; Fig. 6C; Fig. 7, 1; Fig. 8, 1; Fig.9, 60; Fig. 10, 60; Fig. 11, 70; and Fig.12, 60.

Wool does not disclose an arch bar piggybacking a fixed orthodontic appliance.

comprising a metal wire with a longitudinal body having opposing longitudinal ends (Figure 1), a cross-sectional diameter (Figure 3),

Not true, as discussed above.

and the longitudinal body is curved on a flat plane (Figure 1);

This is the same.

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (Figure 7);

Similar is incorrect. Same is correct. See above.

and tying means for attaching the accessory arch bar to an orthodontic appliance, wherein a wire

ligature is used to attach the arch bar to an orthodontic bracket (column 4, lines 9-11).

This is only half true.

Wool discloses tying means such as Fig. 7, 44 wherein the arch wire is tied to the bracket. Wool also discloses pins, which are not tying means, in Figs. 11-14 and in Fig. 16, 100.

The present invention discloses tying means to brackets and tying means securing arch bar 1 to arch wire 30 in Fig. 5C. (See description). Tying to an arch wire is impossible in Wool because only discloses arch wires, not piggybacked arch bars.

Claims are to be construed in light of the specification. Ex parte Kotler, 1901 C.D. 62, 95 O.G. 2684 (Comm'r Pat. 1901). The terms and phrases used in the claims must find clear support or antecedent basis in the description so the meaning of the terms in the claims may be ascertainable by reference to the description. 37 CFR 1.75, MPEP § 608.01 (i) and § 1302.01. Drawings are included if necessary to understand the invention. MPEP § 608.02. Claims are not to be viewed out of context of their specification.

When viewing the claims in light of their specification Wool does not teach or suggest all the above claim limitations.

Prior art must teach or suggest all the claim limitations MPEP § 2143.03. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494 (CCPA 1970).

Claim 7 is allowable.

As to claim 11, Wool fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches; though Wool does disclose a cross-sectional diameter of the arch bar to be 0.022 inches (col 6, In 25). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the cross-sectional diameter 0.027 inches since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

This has been discussed above. Claim 11 is dependent to claim 7 and includes all its limitations; therefore, is allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claim 11 is allowable.

7. **Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of Moss (3,315,359). Wool discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth.**

Wool does not disclose an accessory (or piggybacked) arch bar. As discussed above, Wool discloses an arch wire (not an arch bar) sized to fit within the slot of an orthodontic bracket, not an accessory arch bar as in the present invention. The arch wire is part of the fixed orthodontic appliance.

Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col 2, In 57-60).

Claim 2 in the present invention claims a right angle bend to prevent irritation to the patient and to **prevent dislodging of the end of the arch bar from the tying means (Fig. 5C)**. In the present invention Fig. 5C discloses the ends of the arch bar **bent in at right angles 30 towards the teeth**. One purpose of the bend is the tie wire pictured **won't slide off the end of the archwire 11**. Moss's patent discloses as described in Col. 1, lines 53-55: ".....a bundle of very fine wires, each of which is capable of substantial resilient flexure.....". Lines 59-60 in Col. 2 state: ".....bent **upwards** at right angles to form end sections **as at 15a**". Col. 2, lines 55-56 disclose: "The end sections 15a of the wire are affixed to the tubes 16 by means of soldering." This is disclosed in Figs. 3, 4, 5 and 6. This bundle of wires is very flexible and tends to bend somewhat like a rubber band. Once bent the flexible wire is not rigid enough to hold the bend; therefore, to secure it to the tube 16 it must be soldered to the tube 16. The end bend in the flexible wire does nothing to make the end of the wire more secure. The bend only functions to place the wire in proximity of the tube 16 so it may be soldered to it. The soldering is necessary for headgear, Fig. 6, force be transmitted to the flexible wire 15, described in Col.3, lines 58-64. Further, Moss's bend is in an upward direction as opposed the inwards bend in the present invention.

Wool in view of Moss does not teach or suggest the bent wire end in claim 2 for the same reasons stated in the present invention. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03.). Further, claim 2 refers to and includes all the limitations of claim 1; therefore, claim 2 is allowable if claim 1 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15).

As discussed above, the Moss right angle does not produce a more secure end section but allows the end of the wire to be in position to be soldered. Note in Fig.4 the bent wire 15a enters the tube 16 and must be soldered. The soldering is necessary, because of the extreme flexibility (see above) of the wire, makes the end of the wire secure. The bend of the wire does not make the wire more secure.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

Re claim 2; Wool in view of Moss does not teach or suggest the following limitations :

An accessory arch bar;

Ends bent at right angles towards teeth to prevent a tie wire (securing the arch bar to the arch wire) from
slipping off the end of the arch bar.

{Prior art must teach or suggest all the claim limitations MPEP § 2143.03}.

MPEP 2143.01

If the proposed modification would render the prior art invention being modified **unsatisfactory for its intended purpose**, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F. 2d 900, 221 USPQ 1125 Fed. Cir. 1984).

Wool discloses a specialized arch wire that has rectangular and round cross sections. The wire must fill the requirements of an arch wire that means it must, in part, fit in bracket slots and tubes. Note the arch wire 10 in a tube 36 in Fig. 7. In order to place the arch wire into the tube the end of the arch wire must be straight. Notice in Moss the end of the arch wire 15a is bent at a right angle in Figs. 2-7. The Moss arch wire cannot be placed into a tube. Moss had to use slots (Fig. 8, 19b) instead of tubes to overcome this

drawback. In Orthodontics tubes are universally used on the most posterior teeth. The right angle bend applied to Wool wire would make it impossible to place into a tube making the Wool wire unsatisfactory for its intended use. There is no suggestion or motivation to make the proposed modification.

Further, non-obviousness exists when the suggested combination of references would require a **substantial reconstruction and redesign** of the elements shown (in the primary reference) as well as a change in the basic principle under which the (primary reference) construction was designed to operate. In *re Ratti*, 270 F.2d at 813, 123 USPQ at 352.

The basic principal of the Wool (primary reference) is it must function as an arch wire and fit into a bracket tube which it cannot with the Moss modification.

The right angle bend is not obvious.

The Ratti decision indicates that an obviousness rejection is not appropriate if **substantial reconstruction or redesign** of the prior art references is necessary to arrive at the invention. In *re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

The prior art wires must fit into a .022 inch bracket slot or tube. Increasing the wire size to .025-.060 inch and placing right angle bends at the ends of the wire is a substantial reconstruction or redesign of the wire. Neither change is compatible with the requirements necessary to be an arch wire. The obviousness rejection is inappropriate.

Further claim 2 includes the limitations of independent claim 1. If claim 1 is allowable then claim 2 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

Claim 2 is allowable.

As to claim 8, Wool discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth. Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col 2, In 57-60). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch

bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

The arguments in claim 2 apply to claim 8.

Further claim 8 includes the limitations of independent claim 7. If claim 7 is allowable then claim 8 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

Claim 8 is allowable.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of White (US 6,431,861). Wool discloses an arch bar as previously described, but fails to disclose the bar is comprised of stainless steel.

As discussed above Wool does not disclose an arch bar. Wool discloses an arch wire sized to fit within the slot of an orthodontic bracket, not an accessory arch bar as in the present invention.

White, however, teaches an arch bar

White does not teach an arch bar.

that is comprised stainless steel (col 4, In 20).

White discloses an arch wire, not an arch bar. Refer to White's claim 1, Col. 8, lines 62-63 : "What is claimed is : **"An.arch wire...."**

Therefore, it would have been obvious to one having ordinary skill in the art at the time of Applicant's invention to make the arch bar

Neither Wool or White disclose an arch bar .025-.060 inch in diameter.

out of stainless steel in order to ensure the bar can manipulated to lie within a flat plane or can

substantially follow a continuous curved shape as taught by White.

Re claim 4: Wool in view of White does suggest stainless steel but does not suggest or teach the limitations of claim 1 which claim 4 refers to.

Claim 4 is dependent to claim 1 and claim 1 is allowable.

If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15. The prior art, Wool and Moss, do not teach or suggest the limitations of claim 1. {Prior art must teach or suggest all the claim limitations MPEP § 2143.03}.

Claim 4 is allowable.

9. Claims 6, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of Kelly (US 6,095,809). In re claim 6, Wool discloses a dental arch bar as previously described

Wool does not disclose an arch bar as discussed above.

but is silent as to the composition of the bar being Ti beta 3. However, Kelly teaches an orthodontic arch bar that is comprised of beta-titaniums (col 5, In 46-52). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of Ti beta 3 in order provide a sufficient stiffness and flexibility for the bar to operate as taught by Kelly. In re claims 10 and 12, Wool discloses a dental arch bar as previously described, but is silent as to the composition of the bar. Kelly, however, teaches an orthodontic arch bar that is comprised of metal compositions, including beta-titaniums (col 5, In 46-52). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of metal compositions (i.e. Ti beta 3) in order provide a sufficient stiffness for the bar to operate as taught by Kelly.

Claim 6 includes all the limitations of dependent claim 5 and independent claim 1 which it refers to. Assuming claim 1 is allowable, claim 6 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d

15.). Prior art must teach or suggest all the claim limitations MPEP § 2143.03).

Claim 10 includes all the limitations of independent claim 7 which it refers to. Assuming claim 7 is allowable, claim 10 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.). Prior art must teach or suggest all the claim limitations MPEP § 2143.03).

Claim 12 includes all the limitations of dependent claim 11 and independent claim 7 which it refers to. Assuming claim 7 is allowable, claim 12 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.). Prior art must teach or suggest all the claim limitations MPEP § 2143.03).

Claims 6, 10 and 12 are allowable.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wool in view of Miura (5,017,133). In re claim 9, Wool discloses a dental arch bar as previously described, but is silent as to having ends of said bar that are looped towards the teeth when placed on an orthodontic appliance.

Wool does not teach an arch bar, as discussed above.

Miura, however, teaches bending the ends of an orthodontic arch wire into loops (Figures 2-3) wherein the loop can encircle an orthodontic wire or bracket hook.

Miura's invention is an arch wire, Col. 1, lines 6-7. Miura's arch wire cannot circle another orthodontic arch wire because **it is the arch wire** and a second arch wire is not disclosed. Figs. 2 and 3 in Miura disclose an arch wire passing through the distal (back of the mouth) of a buccal tube. A buccal tube is sized to fit standard orthodontic archwires; but, is a tube. Note in Miura Col. 2, lines 17-20, "The distal ends (of the archwire) are the archwires are therefore deformable into shapes to prevent them from slipping through orthodontic appliances (buccal tube) when mounted thereto. The Miura invention is no more than heating the ends of highly resilient archwires to allow them to be bent. The posterior of an orthodontic appliance usually contain a tube to retain the archwire. The highly resilient wires tend to pull

out of the tube during patient use. The posterior bend of the wire exiting the tube accomplishes prevents the archwire from pulling out of the tube. Miura doesn't disclose the bent wire hooking to a hook or encircling an orthodontic wire. The Miura wire is not an accessory wire, it is an archwire and the only wire disclosed in the drawings. The present invention archbar does not enter a bracket tube which can only hold a wire with a maximum size of .022". Figs. 2 in Miura discloses a loop which is upwards and downwards, not towards the tooth and the loop does not encircle an arch wire. Fig. 3 discloses a wire that goes upwards only and does not circle back on itself.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the arch bar in order to secure said end sections and prevent the arch bar from slipping through the brackets as taught by Miura.

Arch bars do not fit within brackets; therefore slipping through a bracket is not an issue. See specifications in the present invention, Wool and Miura.

Wool in view of Miura does not teach or suggest the limitations of claim 9 as discussed above. (Prior art must teach or suggest all the claim limitations MPEP § 2143.03). Therefore, it would not be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the archbar in order to secure the archbar to an installed archwire. Wool and Miura teach archwires which fit within bracket slots; therefore, don't need a loop to attach to themselves.

Re claim 9: Wool in view of Miura does not teach or suggest the following limitations of claim 9:

- accessory arch bar;**
- ends looped towards teeth;**
- loop encircles an arch wire.**

Further claim 9 includes the limitations of independent claim 7. If claim 7 is allowable then claim 9 is allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.).

Claims 13, 16-17, 19, 21-23, 25 and 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over White (6,431,861). In re claim 13, White discloses an arch bar attached to a fixed orthodontic appliance (Figure 3)

To repeat a prior response, there is no Fig. 3. Figs. 3A and 3B disclose an arch wire enclosed within bracket slots and tubes. Notice the wire disappears within the molar tube and wire fits within the bracket on the most anterior (front) tooth. White does not disclose the arch bar of the present invention. See specification, drawings and claims.

White discloses an arch wire, not an arch bar Refer to Whites claim 1, Col. 8, lines 62-63 : “What is claimed is : “**An.arch wire....**”.

comprising a metal wire with a longitudinal body having opposing ends (Figure 1-2); a cross sectional diameter that can be 0.022 inches (col 6, In 2-3);

This is incorrect. To repeat a prior response, Col. 6, lines 2-3 state: “.....diameter of between 0.012 and 0.022 inch. Fixed orthodontic appliances have bracket slots and tubes with a maximum size of .022 inch: therefore the maximum size of an arch wire is .022 inch.

and a longitudinal axis (Figure 1). White, however, fails to explicitly disclose that the arch bar has a cross-sectional diameter in the range of 0.025 inches to 0.60 inches. However, because White does disclose that the arch bar can have a diameter of 0.022 inches, it would have been obvious to one having ordinary skill in the art at the time of Applicant's invention to make the cross sectional diameter of said arch bar in the range of 0.025 to 0.60 inches since it has been held that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

This has been discussed above. The case of prima facie obviousness absolutely fails.

706.02(j) Contents of a 35 USC 103 Rejection

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must **expressly or impliedly** suggest the claimed invention or the examiner **must present a convincing line of reasoning** as to why the artisan would have found the claimed invention to **have been obvious** in the light of the teachings of the references.” Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

The arch bar as disclosed and claimed is .025-.060 inch in diameter which exceeds the maximum size of an arch wire.

The examiner has not presented a convincing line of reasoning why an artisan would pick an arch wire size that exceeds the maximum size (.022 inch) for an arch wire. Further, White neither expressly or impliedly suggests a wire size exceeding the size of an arch wire slot and definitely not a wire that did not fit into an arch wire slot.

Prima Facie Obviousness

- (4) Some suggestion or motivation.....to modify.....combine.
- (5) Reasonable expectation of success.
- (6) Prior art must teach or suggest all the claim limitations MPEP § 2143.03. In re Wilson, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

White fails all three tests. As discussed, there is no motivation or suggestion to exceed the maximum size for an arch wire; a wire larger than .022 inch cannot fit into an arch wire slot; and White definitely does not teach .025 inch to .060 inch wire sizes nor a wire uniform in size and x-sectional shape in its entire length.

Claim 13 is allowable.

It should also be noted that applicant is claiming an article of manufacture and not the process of forming/making the device, accordingly, the manner in which the device is formed, i.e. forming the desired dental arch shape "with" a flat occlusal plane, is given little weight. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974).

The article of manufacture is a wire. The examiner's observation fails with his own prior art White reference. White's entire patent is the shaping and method of use of an arch wire.

Claim 13 describes how the arch bar is used, not how the wire is actually formed. In the field of orthodontics the word "forming" of a wire refers to bending of the wire, not how the wire is actually made. How the arch bar is used should be given weight. If a structure is identical to the prior art it may still be patentable if a new use is found for that structure. Section 101 of the patent statutes clearly states that **any new use** of a machine, article of manufacture, and the like is patentable subject matter. Pfeiffer, 135 USPQ at 33. MPEP 706.03(a) states: "The term **"process"** as defined in 35 U.S.C. 100, means process, art or method and **includes a new use** of a known process, machine, manufacture, composition of matter, or material." U.S.C. 100 (b) states: "The term **"process"** means process, art or method and includes a **new use** of a known process, machine, **manufacture**, composition of matter, or material."

U.S.C. 101 states: "Whoever invents or discovers any new and **useful process**, machine, manufacture, or composition of matter, any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions of this title. The above is affirmed in *Alappat*, 33F.3d at 1542, 31 USPQ2d at 1556.

In re claims 16, 22 and 28, White discloses the composition of the dental arch bar is stainless steel (col 1, In 38).

Claim 16 refers to independent claim 13, claim 22 refers to independent claim 19 and claim 28 refers to independent claim 25. Independent claims 13, 19 and 25 are non-obvious; therefore dependent claims 16, 22 and 28 are non-obvious. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

In re claims 19 and 25, White discloses the arch bar as previously described,

As discussed above, White does not disclose an arch bar.

as well as shows the wire is curved either upwards or downwards away from the flat plane in the direction that the occlusal plane of the teeth is to be moved (col 5, In 54-59);

Col. 5, lines 54-59, "In the horizontal orthodontic archwire..." White discloses an **arch wire** which fits within the slot of an orthodontic bracket unlike the present invention in claims 19 and 26. The present application, as amended, claims an arch bar which is piggybacked on the cheek side of an installed archwire. White in Col. 1, lines 54-64, refers to Fig. 1A wherein the arch wire starts in the posterior at point 30 and proceeds upwards at points 24 and 26 where it proceeds downwards to point 22 which are better disclosed in Fig. 1B. Compare in the present invention the arch bar 1 in Fig. 7 moves upwards moves upwards as it goes to the front 50. Also note in Fig. 7 there is an existing archwire 11 in the bracket slots. Fig. 9 in the present invention discloses the arch bar going downward from back to front and note the archbar does not return upwards. Claim 19 in the present invention discloses the archbar bent downwards on one side and upwards on the opposite side. Claim 25 in the present invention discloses either both sides bent upwards to the front or both sides bent downwards to the front.

The White arch wire bends are different than the bends in the present invention and the present

invention is not an arch wire. The present invention is an arch bar as described above.

a longitudinal length similar to the length of an arch wire on a fixed orthodontic appliance (Figures 2-3);

White does not have Figs. 2 and 3; but White does disclose actual arch wires which are the length of arch wires because they are arch wires.

and tying means for attaching the accessory arch bar to an orthodontic appliance, wherein a wire ligature is used to attach the arch bar to an orthodontic bracket (col 7, In 10-11).

The tying means is similar; but White discloses an arch wire, not an arch bar. White states in Col. 7, lines 8-11: "To activate the arch wire 10a from its passive state (as shown by phantom line in FIG. 3A) to the illustrated active state, the archwire 10a may be interconnected (e.g., via ligation) to brackets mounted on the.....". Note White is referring to an arch wire which fits into the slots of the brackets. White does not disclose an arch bar which fits external (accessory or piggybacks) to the actual fixed orthodontic appliance. The tying means would be similar; but in White they are used to secure a single arch wire within a bracket slot, not to secure an arch bar and an arch wire simultaneously as in the present invention.

Re claim 19 and 25 White does not expressly or inherently disclose:

an accessory (or piggybacked) arch bar;
and cross-sectional diameter of .025"-.060".

Prior art must teach or suggest all the claim limitations MPEP § 2143.03. In re Wilson, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

Claims 19 and 25 are non-obvious and allowable.

In re claims 21 and 27, White discloses the composition of the arch bar is comprised of metal compositions (col 3, In 50-54).

White describes metal or metal alloys. These broad categories would arguably include the present invention, but not the limitations of the present invention.

Prior art must teach or suggest all the claim limitations MPEP § 2143.03. *In re Wilson*, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

Re claim 21: is dependent to independent claim 19; claim 21 includes all the limitations of claim 19, if claim 19 is allowable claim 21 is allowable. (35 U.S.C. 112).

Re claim 27: is dependent to independent claim 25; claim 27 includes all the limitations of claim 25 if claim 25 is allowable claim 27 is allowable. (35 U.S.C. 112).

“If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

As to claims 17, 23 and 29, White discloses an arch bar as previously described but fails to disclose the specific cross-sectional diameter of the arch bar is 0.027 inches, though White does disclose a cross-sectional diameter of the arch bar to be between about 0.012 inches and 0.022 inches (col 3, In 47-49). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As discussed above, White discloses an arch wire that cannot exceed 0.022” in diameter because it must fit within a bracket slot which is 0.022”. White inherently teaches away from a .027” wire because the White arch wire must fit within a bracket slot which fits within a bracket slot which has a maximum size of .022”. (MPEP § 2144.05 Prima Facie Obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention (*In re Geisler*). Viewing White a person of ordinary skill in the art would not make a wire 0.027” in diameter because it would not fit the slot of standard orthodontic brackets. Claim 17 includes the limitations of independent claim 13, as is true of claim 23 to claim 19 and claim 29 to 25. If claims 13, 19 and 25 are allowable claims 17, 23 and 29 are allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

Re claim 17; White does not teach or suggest the claim limitations:
accessory bar;
diameter of 0.027 inch; and
limitations of claim 13.

Re claim 23: White does not teach or suggest the claim limitations:

accessory bar;
diameter of 0.027 inch: and
limitations of claim 19

Re claim 29: White does not teach or suggest the claim limitations:

accessory bar;
diameter of 0.027 inch: and
limitations of claim 25.

Claims 23, 27 and 29 are allowable.

12. Claims 14, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Moss. In re claims 14, 20 and 26, White discloses a dental arch bar as previously described,

White does not disclose an arch bar as discussed above. White discloses an arch wire with a maximum cross-section of 0.022" because the wire must fit within the slot of an orthodontic bracket.

but is silent as to having ends of said bar that are formed at a right angle to the bar's long axis and directed towards the teeth. Moss, however, teaches bending the ends of an orthodontic arch wire at right angles to form secure end sections (col. 2, In 57-60).

Claims 14, 20 and 26 claim an arch bar, which is bent at a right angle towards the teeth to prevent dislodging of the end of the arch bar from the tying means and secures the arch bar to an arch wire. Moss teaches bending the end of a highly flexible wire upwards in order to solder to a bar above it. The Moss wire is pre-bent prior to its placement on the fixed orthodontic appliance. As discussed above, the end of the Moss wire is made more secure by soldering the wire to the bar 16. The bend in the Moss wire does not make it more secure. Further, as discussed above, the Moss bends are not towards the teeth. The bends are upwards.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form right angles in the end sections of the arch bar in order to create secure end sections that do not irritate the inside portions of a patient's mouth as taught by Moss.

As discussed above, Moss did not teach either of these purposes. White discloses arch wires which fit a .022" bracket slot, Moss discloses an arch wire bent at a right angle, not towards the teeth (not directed towards the teeth), in order to solder the end of the wire to another wire. A person of ordinary skill in the art would not view White in view of Moss and find they teach or suggest the claim limitations of claims 14, 20 and 26 wherein an accessory bar is piggybacked on an installed arch wire and the distal ends of the archbar are bent at a right angle in order to prevent a tie wire connecting the archbar to the arch wire from being dislodged. (Prior art must teach or suggest all limitations of the claim. MPEP § 2143.03. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494 (CCPA 1970).

Further, non-obviousness exists when the suggested combination of references would require a **substantial reconstruction and redesign** of the elements shown (**in the primary reference**) as well as a change in the basic principle under which the (**primary reference**) construction was designed to operate. In re Ratti, 270 F.2d at 813, 123 USPQ at 352.

The basic principal of the White (primary reference) is it must function as an arch wire and fit into a bracket tube, which it cannot, with the Moss modification. The Moss right angle bend on the White arch wire would not allow the White arch wire to be placed into an arch wire molar tube. (Note, the Moss wire right- angled end must be pre-bent prior to placing on the fixed appliance—see Moss claims and specifications with drawings). The basic principal of White, which is specially bent arch wires that can be placed on a standard orthodontic appliance, would have to be change. Molar teeth would have to have bracket slots instead of tubes that would allow the placement of an arch wire with right angle bends at their ends.

The right angle bend is not obvious.

The Ratti decision indicates that an obviousness rejection is not appropriate if **substantial reconstruction or redesign** of the prior art references is necessary to arrive at the invention. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

MPEP 2143.01

If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F. 2d 900, 221 USPQ 1125 Fed. Cir. 1984).

The prior art wires must fit into a .022 inch bracket slot or tube. Increasing the wire size to .025-.060 inch and placing right angle bends at the ends of the wire is a substantial reconstruction or redesign of the wire. Neither change is compatible with the requirements necessary to be an arch wire. The White wire with the right angle end would definitely be unsatisfactory for its intended use.

The obviousness rejection is inappropriate.

Claim 14 is dependent on independent claim 13 and includes all its limitations. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claim 14 is non-obvious.

Claim 20 is dependent on independent claim 19 and includes all its limitations. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claim 20 is non-obvious.

Claim 26 is dependent on independent claim 25 and includes all its limitations. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Claim 26 is non-obvious.

13. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Miura. In re claim 15, White discloses a dental arch bar as previously described,

White does not disclose an arch bar, as discussed above. Claim 15 includes all the limitations of independent claim 13 to which dependent upon. (Prior art must teach or suggest all limitations of the claim. MPEP § 2143.03. *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494 (CCPA 1970). (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.).

Claim 15 is non-obvious.

but is silent as to having ends of said bar that are looped towards the teeth when placed on an orthodontic appliance. Miura, however, teaches bending the ends of an orthodontic arch wire into loops (Figures 2-3) wherein the loop can encircle an orthodontic wire or bracket hook.

Miura's invention is an arch wire, Col. 1, lines 6-7. Miura's arch wire cannot circle another orthodontic arch wire because **it is the arch wire** and a second arch wire is not disclosed. Figs. 2 and 3 in Miura disclose an arch wire passing through the distal (back of the mouth) of a buccal tube. A buccal tube is sized to fit standard orthodontic archwires; but is a tube. Note in Miura Col. 2, lines 17-20, "The distal ends (of the archwire) are the arch wires are therefore deformable into shapes to prevent them from slipping through orthodontic appliances (buccal arch wire tube) when mounted thereto. The Miura invention is no more than heating the ends of highly resilient archwires to allow them to be bent. The posterior of an orthodontic appliance usually contain a tube to retain the archwire. The highly resilient wires tend to pull out of the tube during patient use. The posterior bend of the wire exiting the tube accomplishes prevents the archwire from pulling out of the tube. Miura does not disclose the bent wire hooking to a hook or encircling an orthodontic wire. The Miura wire is not an accessory bar, it is an arch wire and the only wire disclosed in the drawings. The present invention arch bar does not enter a bracket tube which can only hold a wire with a maximum size of .022". Figs. 2 in Miura discloses a loop which is upwards and downwards, not towards the tooth and the loop does not encircle an arch wire. Fig. 3 discloses a wire that goes upwards only and does not circle back on itself.

Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to form loops in the end sections of the arch bar in order to secure said end sections and prevent the arch bar from slipping through the brackets as taught by Miura.

As discussed above, Miura did not teach either of these purposes. White discloses arch wires which fit a .022" bracket slot, Miura discloses an arch wire bent at the end. A person of ordinary skill in the art would not view White in view of Miura and find they teach or suggest the claim limitations of claims 14, 20 and 26 wherein an accessory bar is piggybacked on an installed arch wire and the distal ends of the arch bar are bent in a loop towards the teeth which encircles the arch wire in order to prevent a tie wire connecting the archbar to the arch wire from being dislodged. Further, looping an arch wire with an arch bar is not inherent in Miura (MPEP 2131.01) because Miura only discloses an arch wire, not an arch bar. (Prior art must teach or suggest all limitations of the claim. MPEP § 2143.03. In re Wilson,

424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

The Ratti decision indicates that an obviousness rejection is not appropriate if substantial reconstruction or redesign of the prior art references is necessary to arrive at the invention. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

706.02(j) Contents of a 35 USC 103 Rejection

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must **expressly or impliedly** suggest the claimed invention or the examiner **must present a convincing line of reasoning** as to why the artisan would have found the claimed invention to **have been obvious** in the light of the teachings of the references." Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

Miura deadens the end of an arch wire to allow easier bending of the arch wire end. White teaches different configurations of an arch wire. The White wire could have the ends deadened. Arch wires are shaped and sized, .022 inch maximum, to fit into a bracket tube or slot which have a maximum size of .022 inch. There is no suggestion in the references that the arch wire sizes should be .025-.060 inch. The .025-.060 inch wire would no longer fit into the bracket slots and tubes. The wire could no longer function as an arch wire; therefore, it is not an arch wire. There is no motivation in the references to exceed the size of an arch wire. The examiner has presented no convincing line of reasoning.

Prima Facie Obviousness

1. Some suggestion or motivation.....to modify.....combine.

There is none

2.Reasonable expectation of success.

Arch wires cannot exceed .022 inch. Larger than .022 inch cannot be successfully used as an arch wire.

3.Prior art must teach or suggest all the claim limitations MPEP § 2143.03. In re Wilson, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

White in view of Miura does not teach or suggest all the claim limitations as discussed above.

Claim 15 is non-obvious.

14. Claims 18, 24 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Kelly. In re claims 18, 24 and 30, White discloses a dental arch bar as previously described,

White does not disclose an arch bar. Col. 5, lines 54-59, "In the horizontal orthodontic arch wire...." White discloses an arch wire which fits within the slot of an orthodontic bracket unlike the present invention in claims 19 and 26, as amended, claims an arch bar which is piggybacked on the cheek side of an installed archwire. White in Col. 1, lines 54-64, refers to Fig. 1A wherein the wire starts in the posterior at point 30 and proceeds upwards at points 24 and 26 where it proceeds downwards to point 22 which is better disclosed in Fig. 1B. Compare in the present invention the arch bar 1 in Fig. 7 moves upwards as it goes to the front 50. Also note in Fig. 7 there is an existing archwire 11 in the bracket slots. Fig. 9 in the present invention discloses the arch bar going downwards from back to front and note the archbar does not return upwards. Claim 19 in the present invention discloses the archbar bent downwards on one side and upwards on the opposite side. Claim 25 in the present invention discloses either both sides bent upwards to the front or both sides bent downwards to the front.

but is silent as to the composition of the bar being Ti beta 3. However, Kelly teaches an orthodontic arch bar that is comprised of beta-titaniums (col 5, In 46-52). Therefore, it would be obvious to one having ordinary skill in the art at the time of the applicant's invention to make the arch bar comprise of Ti beta 3 in order provide a sufficient stiffness and flexibility for the bar to properly operate as taught by Kelly.

Kelly, as discussed above, discloses an arch wire, not an accessory arch bar. A person of ordinary skill in the art would not view the stiffness and flexibility disclosed in Kelly which applies to an arch wire which has a maximum diameter of 0.022" and find Ti beta 3 an obvious choice for a larger 0.027" wire.

Claims 18, 24 and 30 each include the limitations of the independent claims they refer to. Claim 18 refers to claim 17 which refers to claim 13, claim 24 refers to claim 23 which refers in turn to claim 19 and claim 30 refers to claim 29 which refers to claim 25. Claims 17, 23 and 29 claim an arch bar with a diameter of .027".

If the respective independent claims are allowable the Claims 18, 24 and 30 include all the limitations of their independent claims and are allowable. (If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 15.)

Re claim 18: White in view of Kelly does not teach or suggest the limitation of:
an arch bar: and
the limitations of claim 17.

Re claim 24: White in view of Kelly does not teach or suggest the limitation of:
an arch bar: and
the limitations of claim 23.

Re claim 30: White in view of Kelly does not teach or suggest the limitation of:
an arch bar: and
the limitations of claim 29.

White and Kelly inherently teach away from a .027" wire because the White and Kelly teach an arch wire is limited by the maximum bracket slot size of .022". (MPEP § 2144.05 Prima Facie Obviousness may be rebutted by showing that the art, in any material respect, teaches away from the claimed invention (In re Geisler)).

The Ratti decision indicates that an obviousness rejection is not appropriate if substantial reconstruction or redesign of the prior art references is necessary to arrive at the invention. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

The prior art of White and Kelly teach arch wires that have a maximum size of .022 inch. Substantial reconstruction and redesign would be necessary to increase the wire size to .025-.060 inch. The increase in size will not fit the bracket slots.

706.02(j) Contents of a 35 USC 103 Rejection

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must **expressly or impliedly** suggest the claimed invention or the examiner **must present a convincing line of reasoning** as to why the artisan would have found the claimed

invention to **have been obvious** in the light of the teachings of the references.” Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

White and Kelly, as discussed above, disclose an arch wire, not an accessory arch bar. A person of ordinary skill in the art would not view the stiffness and flexibility disclosed in White in view of Kelly which applies to an arch wire which has a maximum diameter of 0.022” and find Ti beta 3 an obvious choice for a larger 0.027” wire. T

He examiner has not presented a convincing line of reasoning why the arch bar is obvious.

Prima Facie Obviousness

1. Some suggestion or motivation.....to modify.....combine.

There is no suggestion or motivation to exceed the maximum size of an arch wire and place the wire outside bracket slots.

2. Reasonable expectation of success.

There is no reasonable expectation that a .025-.060 inch wire can be used as an arch wire.

3. Prior art must teach or suggest all the claim limitations MPEP § 2143.03. In re Wilson, 424 F.2d1382, 1385, 165 USPQ 494 (CCPA 1970).

Prior art, as discussed above, does not teach or suggest all the claim limitations.

Claims 18, 24 and 30 are not obvious.

The following amendments have been made:

Claim 1, line 8. “.....~~0.20~~ in. to .60 in. to .025 in. to .060 in.

Claim 7, line 8. “.....~~0.20~~ in. to .60 in. to .025 in. to .060 in.

Claim 13, line 4 after diameter add .025 in. to .060 in.

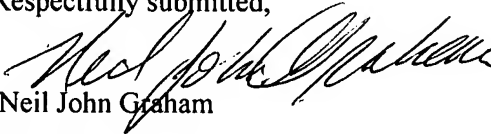
Claim 19, line 9. “.....~~0.20~~ in. to .60 in. to .025 in. to .060 in.

Claim 25, line 9. “.....~~0.20~~ in. to .60 in. to .025 in. to .060 in.

The specification and claims are amended throughout using the term fixed orthodontic appliance to

describe a **fixed orthodontic appliance**, an **installed orthodontic appliance** and **braces** which are all synonymous terms.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Neil John Graham", written in a cursive style.

Neil John Graham

Reg. No. 51,179